INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
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Bridgman, MI 49106
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April 12, 2005

AEP:NRC:5055-01
10 CFR 50.55a

Docket No. 50-315

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 1
PROPOSED ALTERNATIVE TO THE
AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE, SECTION XI
REPAIR REQUIREMENTS

Reference: Letter from Joseph N. Jensen, Indiana Michigan Power Company, to Nuclear Regulatory Commission, "Donald C. Cook Nuclear Plant Units 1 And 2, Nuclear Regulatory Commission Bulletin 2004-01, Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors, Sixty-Day Response," AEP:NRC:4054-07, dated July 26, 2004.

Pursuant to 10 CFR 50.55a(a)(3)(i), Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant Units 1 and 2, is proposing an alternative to the repair requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code).

During the present Unit 1 refueling outage, I&M personnel, in accordance with the reference letter response, conducted nondestructive examinations of the pressurizer Alloy 82/182 welds. During the examination of the pressurizer safety nozzle to safety valve inlet line weld, a flaw was detected. I&M plans to repair this weld using a weld overlay rather than the ASME Code, Section XI required repair. I&M is proposing an alternative to the provisions of the ASME Code, Section XI, in accordance with the provisions of 10 CFR 55a(a)(3)(i). The attachment to this letter provides I&M's proposed alternative and the basis for I&M's conclusion that the proposed alternative provides an acceptable level of quality and safety.

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I&M requests approval of the proposed alternative by April 15, 2005, to support the current Unit 1 outage schedule. There are no new commitments identified in this letter. Should you have any questions, please contact Mr. John A. Zwolinski, Director of Safety Assurance at (269) 466-2428.

Sincerely,

Daniel P. Fadel
Engineering Vice President

Attachment: 10 CFR 50.55a Relief Request – ISIR-15, Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(i)

c: R. Aben – Department of Labor and Economic Growth
J. L. Caldwell – NRC Region III
K. D. Curry – AEP Ft. Wayne, w/o attachment
J. T. King – MPSC, w/o attachment
C. F. Lyon – NRC Washington DC
MDEQ – WHMD/HWRPS, w/o attachment
NRC Resident Inspector

Attachment to AEP:NRC:5055-01

10 CFR 50.55a Relief Request –ISIR-15
Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(i)

1.0 ASME CODE COMPONENTS AFFECTED

Code Class:	Class 1
Reference:	ASME Section XI, 1989, no addenda ASME Section XI, Case N-504-2 ASME Code Case N-416-1 ASME Section III, 1965 Edition, Winter 1966 Addenda ASME Section III, 1992 Edition
Examination Categories:	B-F
Item Number:	B5.40
Description:	Alternative Welded Repair For the Pressurizer Safety Nozzle To Safety Valve Inlet Line
Component Number:	1-PRZ-23

2.0 APPLICABLE CODE EDITION AND ADDENDA

ASME Section XI 1989 Edition, no addenda

3.0 APPLICABLE CODE REQUIREMENTS

IWA-4000 and IWB-4000 of ASME Section XI require repairs to be performed in accordance with the Owner's Design Specification and the original construction Code of the component or system.

4.0 REASON FOR REQUEST

During the Unit 1 Cycle 20 refueling outage, an ultrasonic examination of 1-PRZ-23 identified an axial flaw (see Figure 1) within the Alloy 82/182 weld material. The flaw was most likely caused by Primary Water Stress Corrosion Cracking (PWSCC). 1-PRZ-23 is a nozzle-to-safe end weld containing Alloy 82/182 weld material connecting a carbon steel nozzle to an austenitic stainless steel safe end. The Code acceptable repair method would require complete removal of the PWSCC flaw.

The nozzle material is SA-216 WCC carbon steel. The safe end is austenitic stainless steel SA-182 F316. The nozzle weld material connecting the carbon steel nozzle to the austenitic safe end is Alloy 82/182.

Pursuant to 10 CFR 50.55a(a)(3)(i), an alternative is requested on the basis that the proposed alternative repair will provide an acceptable level of quality and safety.

5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE

A full structural weld overlay repair is proposed for the nozzle-to-safe end weld. ASME Code Case N-504-2 allows a flaw to be reduced to an acceptable size by deposition of weld reinforcement (weld overlay) on the outside surface of the pipe without flaw removal.

The nozzle material is SA-216 WCC carbon steel. The safe end is austenitic stainless steel SA-182 F316. The nozzle weld material connecting the carbon steel nozzle to the austenitic safe end is Alloy 82/182.

The weld overlay has been designed consistent with the requirements of ASME Code Case N-504-2, "Alternative Rules for Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping," with the exceptions noted below. The weld overlay will extend around the full circumference of the nozzle-to-safe end weld location as required by Code Case N-504-2. The specific thickness and length have been computed according to the guidance provided in Code Case N-504-2. The overlay will completely cover the indication with Alloy 52 material. Alloy 52 material is highly resistant to PWSCC.

In order to perform this repair, it is necessary to weld to the carbon steel nozzle material. The Code of Construction allows welding to the carbon steel nozzle without post weld heat treatment. The Code of Construction exemption for post weld heat treatment is based on the pressurizer safety nozzle material (SA-216 WCC, P-No.1 Group 2 material) thickness being less than 1.25 inches and the carbon content being less than 0.30%. The nozzle thickness is 1.22 inches and the maximum specified carbon content is 0.25%.

The Code of Construction does not require pre-heat or post-weld heat treatment for a component 1.25 inches thick or less with a maximum carbon content of 0.30%.

Code Case N-504-2 was approved for generic use in Regulatory Guide 1.147, Revision 13, and was developed for austenitic stainless steel material. An alternate application for nickel-based and carbon materials is proposed due to the specific configuration of the subject weld. Therefore, the methodology of Code Case N-504-2 shall be followed with the following exceptions:

1. Paragraph (b) of Code Case N-504-2 requires that the reinforcement weld material shall be low carbon (0.035% maximum) austenitic stainless steel. In lieu of the stainless steel weld material, a consumable welding wire highly resistant to PWSCC has been selected for the overlay weld material. This material is a nickel-based alloy weld material, commonly referred to as Alloy 52, and will be applied using a machine gas tungsten arc

welding process. Alloy 52 contains about 30% chromium that imparts excellent corrosion resistance to this material. This material is suitable for welding over the carbon steel nozzle, Alloy 82/182 weld material, stainless steel safe end, stainless steel weld material, and stainless steel piping as it is compatible with the existing weldment and base materials. Accordingly, this alternative provides an acceptable level of safety and quality.

2. Paragraph (e) of Code Case N-504-2 requires as-deposited delta ferrite measurements of at least 7.5 Ferrite Number for the weld reinforcement. Delta ferrite measurements will not be performed for this overlay because the deposited Alloy 52 is 100% austenitic and contains no delta ferrite due to the high nickel composition (approximately 60% nickel). Accordingly, this alternative provides an acceptable level of safety and quality.

3. Paragraph (h) of Code Case N-504-2 requires a system hydrostatic test of the completed repair if the flaw(s) penetrated the original pressure boundary or if there is any observed indication of the flaw penetrating the pressure boundary during repair. In lieu of hydrostatic testing, a system pressure test and an ultrasonic examination of the weld overlay shall be performed in accordance with the Third Interval ISI Program and ASME Code Case N-416-1. This alternative requirement is sufficient to demonstrate that the overlay is of adequate quality to ensure the pressure boundary integrity. Accordingly, this alternative provides an acceptable level of safety and quality.

The repair, pre-service inspection, and inservice inspection (ISI) examination of the weld overlay repair shall be performed in accordance with the ISI Program, NUREG-0313, Revision 2, Generic Letter 88-01, and approved plant procedures as specified by the ISI Repair/Replacement Program. The weld overlay shall be examined in accordance with the industry-developed Performance Demonstration Initiative procedure. As required by Code Case N-416-1 (Alternative Pressure Test Requirement for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2, and 3), nondestructive examination shall be performed to ASME Section III, 1992 Edition, Subsection NB requirements to the extent practical. A description of the required examinations is provided in Tables 1, 2, and 3. The acceptance criteria for the volumetric examinations shall be ASME Section XI, Paragraph IWB-3514, "Standards for examination Category B-F, Pressure Retaining Dissimilar Metal Welds, and Category B-J, Pressure Retaining Welds In Piping."

The use of overlay filler material that provides excellent resistance to PWSCC develops an effective barrier to flaw extension by corrosion processes. The design of the overlay for the nozzle-to-safe end weldment uses methods that are standard in the industry. There are no new or different approaches in this overlay design which are considered first of a kind or inconsistent with previous approaches. The overlay has been designed as a full structural overlay in accordance with Code Case N-504-2. I&M concludes that the alternative repair approach described above presents an acceptable level of quality and safety to satisfy the requirements of 10 CFR 50.55a(a)(3)(i).

6.0 DURATION OF THE PROPOSED ALTERNATIVE

This alternative repair is requested for the remaining service life of the component.

7.0 PRECEDENT

Similar requests have been approved for the Three Mile Island, Unit 1, Nuclear Station (Reference 1) and the Cooper Nuclear Station (Reference 2).

8.0 REFERENCES

1. Letter from Richard J. Laufer, Nuclear Regulatory Commission (NRC), to Christopher M. Crane, AmerGen Energy Company, "Three Mile Island Nuclear Station, Unit 1 (TMI-1) Request for Relief from Flaw Removal, Heat Treatment, and Nondestructive Examination Requirements for the Third 10-Year Inservice Inspection (ISI) Interval (TAC No. MC1201)," dated July 21, 2004.

2. Letter from Allen G. Howe, NRC, to Randall K. Edington, Nebraska Public Power District, "Cooper Nuclear Station – Re: Request RI-35 for Relief from the Requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) (TAC No. MC4954)," dated March 4, 2005.

TABLE 1
IN-PROCESS NONDESTRUCTIVE EXAMINATION REQUIREMENTS

Examination Description	Method	Technique	Reference	Acceptance Standards
Safe end, weld, and nozzle overlay surface preparation exam	Surface	Liquid Penetrant	N-504-2	N-504-2, Paragraph (c)
1st layer of deposited weld reinforcement	Surface	Liquid Penetrant	N-504-2	N-504-2, Paragraph (c)
Thickness measurement of the deposited weld reinforcement	Volumetric	UT-0°L	N-504-2, Repair Plan	Per weld overlay design

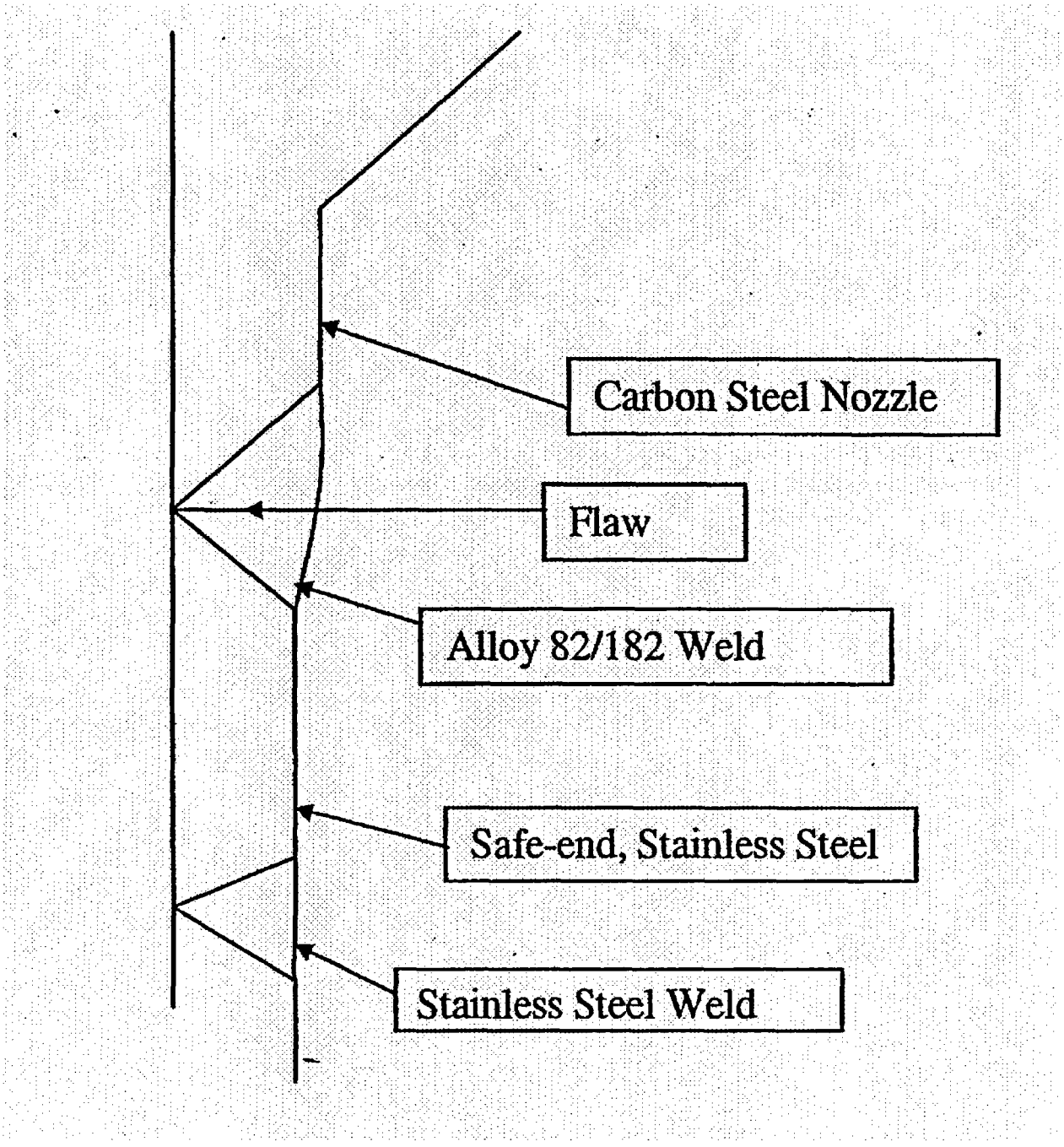
TABLE 2
PRE-SERVICE INSPECTION REQUIREMENTS

Examination Description	Method	Technique	Reference	Acceptance Standards
Completed weld overlay for complete bonding and minimum thickness	Volumetric	UT-0°L	N-504-2	Per weld overlay design
Examination of completed weld overlay and examination of the "band" 0.50 inches outward from the toe of the weld around the entire circumference of the nozzle	Surface	Liquid Penetrant	N-504-2	N-504-2, Paragraph (i)
Completed weld overlay and outer 25 percent of original nozzle and safe end thickness	Volumetric	UT angle beam per PDI procedure	N-504-2	N-504-2, Paragraph (i)

TABLE 3
INSERVICE INSPECTION REQUIREMENTS

Examination Description	Method	Technique	Reference	Acceptance Standards	Reinspection Frequency
Weld overlay and upper 25 percent of original nozzle and safe end base material	Volumetric	UT-Angle beam per PDI procedure, and exam volume per PDI procedure	ASME Section XI, Appendix VIII	No planar flaw extending into the structural weld overlay	Exam next two refueling outages, and reevaluate based on inspection results
Surface examination of complete weld overlay surface	Surface	Liquid Penetrant	ASME, Section XI	N-504-2, Paragraph (i)	Exam next two refueling outages, and reevaluate based on inspection results

FIGURE 1


Carbon Steel Nozzle
Flaw
Alloy 82/182 Weld
Safe-end, Stainless Steel
Stainless Steel Weld